REMARKS/ARGUMENTS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-7 are presently pending in this application.

In the outstanding Office Action, Claim 7 was objected to under 37 C.F.R. §1.75(c) as being of improper dependent form; Claims 1, 6 and 7 were rejected under 35 U.S.C. §102(b) as being anticipated by Luthra et al. (U.S. Patent 5,962,103); Claims 1, 6 and 7 were rejected under 35 U.S.C. §102(b) as being anticipated by Hanzawa (U.S. Patent 5,851,941); and Claims 1, 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Luthra et al. in view of Krenkel et al. (U.S. Patent 6,358,565).

With regard to the objection to Claim 7, the outstanding Office Action asserts that Claim 7 fails to further limit the subject matter of a previous claim because "[t]he nature of the decomposable precursor does not impart further structural limitations to the final product." However, it is respectfully submitted that Claim 7 recites a material of a porous structural body, and the final product, that is, the composite of silicon carbide and silicon retains a shape of the porous structural body as illustrated in Figs. 1(a)-1(f). As such, the final products have structural differences such as the size of pores and the porosity, depending on the material of the porous structural body as recited in Claim 7. Therefore, Claim 7 is believed to further limit the subject matter of Claim 6. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language and expedite the prosecution of the present application.

Briefly recapitulating, Claim 1 is directed to a silicon carbide-based, porous, heat-resistant structural material produced by a process including the steps of preparing a porous

structural body comprised of a corrugated cardboard material and having a framework, infiltrating a slurry containing powdered silicon and a carbon source comprised of a resin into the porous structural body, firing the porous structural body in an evacuated or an inert atmosphere such that the corrugated cardboard material is decomposed to form a carbonized composite having the framework, performing reaction-bonding so as to form silicon carbide having sufficient molten silicon wettability such that molten silicon penetrates into the porous structural body and to simultaneously form open pores by the reaction-bonding which decreases a volume of the porous structural body, and infiltrating molten silicon into the open pores of the porous structural body so as to form a composite of silicon carbide and silicon having the framework of the porous structural body. By forming the composite of silicon carbide and silicon as such, the composite of silicon carbide and silicon substantially retains the shape of a corrugated cardboard material and achieves a higher mechanical strength.

The outstanding Office Action asserts that Claim 1 is anticipated by Luthra et al. or Hanzawa on the bases that "there is no nexus that requires that the framework in question is the entirety of the corrugated cardboard" and that "the term "framework" does not imbue the claims with any significant structure." However, Applicant respectfully submits that in interpreting a claim term, the specification should be relied on, as stated in MPEP2111.01 as follows:

> "The specification should also be relied on for more than just explicit lexicography or clear disavowal of claim scope to determine the meaning of a claim term when applicant acts as his or her own lexicographer; the meaning of a particular claim term may be defined by implication, that is, according to the usage of the term in context in the specification. See *Phillips v. AWH Corp.*, __F.3d__, 75 USPQ2d 1321 (Fed. Cir. 2005) (*en banc*); and *Vitronics Corp. v. Conceptronic Inc.*, 90 F.3d 1576, 1583, 39 USPQ2d 1573, 1577 (Fed. Cir. 1996)."

For example, the term "framework" is used in the following context in Applicant's specification:

> "... a silicon carbide-based, porous, lightweight, heat-resistant structural material is produced by a process comprising a step of preparing ... a porous structural body which is decomposed during firing in an evacuated or an inert atmosphere, *each porous structure body having a framework which retains the shape of the porous structure body after firing*, ..."[1]

Furthermore, Figs. 1(a)-1(f) clearly show that the SiC/Si composite retains the original corrugated cardboard structure. Therefore, Applicant respectfully requests reconsideration of the term "framework" in Claim 1 based on the disclosure of the specification.

Luthra et al. and Hanzawa merely discuss a silicon carbide-silicon composite matrix and a Si/SiC-based sintered material, respectively. The Office Action asserts that Luthra et al. teaches that "the source of carbon may be from pyrolyzed carbon," but it is respectfully submitted that Luthra et al. merely discusses a coating material for bundled silicon carbide fibers, and smaller carbon materials such as carbonized plant fibers, lamp black, etc.[2] are used as the source of carbon, not a bulky material such as corrugated cardboard. When paper such as corrugated cardboard is pyrolyzed, its weight decreases to 10% of the original weight. Of the decreased weight, calcium carbonate and titanic oxide, etc. are 50%, and carbon is only 5%. Accordingly, it is impossible to use cardboard as a carbon coating material for fibers, since it has many apertures. In contrast, the carbon source is comprised of a resin according to Claim 1. Furthermore, in the Luthra et al. method, the carbon material is used for coating a fiber of the fiber-reinforced composite, not for the purpose of increasing the strength. For example, Claim 12 of Luthra et al. recites "carbon particulate" which is not used as a

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[1] Specification, page 6, lines 1-9 (emphasis added).
[2] See Luthra et al., column 5, lines 32-37.

reinforcing material. For the foregoing reasons, the material recited in Claim 1 is believed to be distinguishable from both Luthra et al. and Hanzawa.

Krenkel et al. is directed to a method for making a protective coating containing silicon carbide. Nevertheless, Krenkel et al. fails to teach a composite of silicon carbide and silicon implied by the steps of "preparing a porous structural body comprising a corrugated cardboard material and having a framework; ...infiltrating a slurry containing powdered silicon and *a carbon source comprising a resin* into the porous structural body; firing the porous structural body ...; performing reaction-bonding ...; and infiltrating molten silicon into the open pores of the porous structural body so as to form a composite of silicon carbide and silicon having the framework of the porous structural body" as recited in amended Claim 1. Specifically, Krenkel et al. relates to a method for making a coating on a substrate surface, and the surface is initially provided with a porous carbonaceous material. When a carbonaceous material turns into silicon carbide, the volume of the carbonaceous material increases by approximately 58%, and thus the carbonaceous raw material should have a porous body whose porosity is applicable to the cubical expansion. In Krenkel et al., the carbonaceous raw material has an open porosity in a range between 40 and 95%, but the finished coating which contains free silicon is denser than the carbonaceous raw material.

The outstanding Office Action asserts that "Krenkel et al. teaches that carbon fibers for carbon-containing composites may come for pyrolyzing sources such as cardboard," and that "it would have been obvious ... to have used cardboard as the source for the carbon fibers." It is, however, respectfully submitted that Krenkel et al. merely discusses the use of plain paper instead of a *corrugated* cardboard for providing coating on a flat substrate having a plate shape and made of carbon, silicon carbide, C/C, C/C-SiC or SiC/SiC.[3] Also, since it is

[3] Krenkel et al., column 3, lines 11-24.

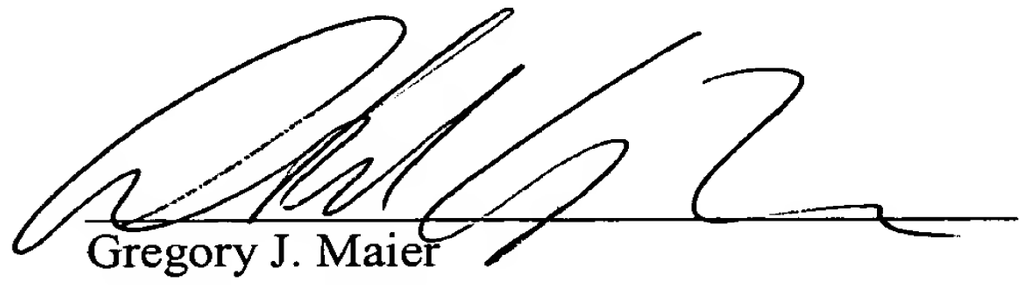
merely a protective coating and not intended to increase the strength of the composite, there is no need to use corrugated cardboard in the Krenkel et al. method. Therefore, the material recited in Claim 1 is believed to be distinguishable from Krenkel et al.

Turning now to Claim 6, Claim 6 is directed to a silicon carbide-based, porous, heat-resistant structural material including a composite of silicon carbide and silicon produced by a process including the steps of preparing a porous structural body comprised of a decomposable porous material and having a framework, infiltrating a slurry containing powdered silicon and a carbon source into the porous structural body, firing the porous structural body in an evacuated or an inert atmosphere such that the decomposable porous material is decomposed to form a carbonized composite having the framework, performing reaction-bonding so as to form silicon carbide having sufficient molten silicon wettability such that molten silicon penetrates into the porous structural body and to form open pores by the reaction-bonding which decreases a volume of the porous structural body, and infiltrating molten silicon into the open pores of the porous structural body so as to form the composite of silicon carbide and silicon having the framework of the porous structural body. For substantially the same reasons as discussed above, Claim 6 and its dependent Claim 7 are also believed to be distinguishable from Luthra et al., Hanzawa and Krenkel et al.

In view of the discussions presented above, Applicant respectfully submits that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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